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LEARNING IN INTER-ORGANIZATIONAL NETWORKS

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ABSTRACT

This paper focuses on how learning occurs inside public networks, by taking the perspective of individual organizations inside the network itself. Starting from previous literature, two main dimensions have been explored in connection with learning outcome: social dynamics and administrative stability. A QCA analysis has been adopted to identify the conditions that lead to learning outcome, by analyzing an Italian public network of universities in charge of identifying best practices to improve the delivery of administrative services. Results details and discuss the group of conditions that affect organizational learning in networks (i.e. actors' interactions, top-level commitment), posing the basis for further research in this field.

INTRODUCTION

Research on public networks has strongly blossomed during the last fifteen years. Benefits of this new organizational arrangement have been acknowledged in sharing organizational experiences, identifying innovative solutions to common problems (Dawes et al., 2009; Askim et al., 2007), which finally led to the improvement of public sector performance (Gerlak and Heikkila, 2011; Moyhihan and Landuyt, 2009). A variety of network aspects have been explored starting from network structure, effectiveness, governance mechanisms, arriving until network management and development (see Turrini et al., 2010; Kenis and Provan, 2009).

In this proliferating literature, scant attention has been devoted to the learning process of networks, also called inter-organizational learning (Askim et al., 2007) or collective learning (Gerlak and Heikkila, 2011; Moynihan and Landuyt, 2009; Knight, 2002). This network learning process is defined as the changing practices and dynamics across a group of organizations involved in a network (Knight and Pye, 2003; Knight, 2002). The relevance of organizational and inter-organizational learning is widely acknowledged: understanding how learning occurs might be helpful from a practical perspective to improve organizational capabilities and therefore performance (Knight and Pye, 2003); shared learning can improve the ability of public organizations to address common problems while developing communities of practices between professionals (Dawes et al., 2009). Finally, the capacity of learning within networks is considered a *condicio sine qua non* for the endurance of these institutional arrangements (Gerlak and Heikkila, 2011, 2007; Pennington, 2008; Ansell and Gash, 2007), as long as public organizations are increasingly struggling to improve their knowledge and performance through interactions with other organizations (Larson, 1992).

Existing studies on learning process in networks and collaborative arrangements focused mainly on two aspects. First, efforts have been devoted at conceptualizing what is learning in networks and how many “learning entities” exist in networked situations (Dawes et al., 2009; Knight and Pye, 2003; Knight, 2002). These studies actually enrich our understanding of learning in networks by the identification of different learners, i.e. the individual, the team, the organization and the network as a whole, and with a relatively different conceptualization of learning in each level. The second investigated aspect (see Gerlak and Heikkila, 2011; Moynihan and Landuyt, 2009; Askim et al., 2007) focuses on factors that affect network learning, by analyzing how these factors actually influence the learning process in networks. Although the relevance of understanding which factors play a central role in favoring learning, they have always been considered in isolation.

Starting from this latest stream of research, we focus on conditions that can affect learning in networks. Specifically, by considering the participant organization as the learner (i.e. the unit of analysis), we explore the combination of factors that lead to learning in networks. To accomplish this research objective, we apply the Qualitative Comparative Analysis (QCA), in its binary version, i.e. crisp-set QCA, in which causal conditions, and outcome too, can assume only two values, 0 or 1. QCA analysis is carried out with the TOSMANA software. The use of QCA allows us to identify the sufficiency or necessity relationships between conditions said to affect learning and the effective occurrence of organizational learning. Our empirical case is a network of universities, named Academic Group (real name omitted for confidentiality reasons), that was voluntary constituted by a group of Italian universities in 1999. Its purpose was that of measuring and benchmarking administrative services performance in order to identify best practices to improve service quality. Within this network, we considered each university as a “single case study” on which the causal conditions and the presence of outcome (i.e. learning) were evaluated.

This article unfolds as follows. We first review the literature on learning in networks with a specific focus on conditions that are thought to affect learning processes. We then describe the methodology of analysis detailing how the learning conditions have been operationalized and the Academic Group network. We continue with presentation of findings and we conclude with discussion and suggestions for future research.

LITERATURE REVIEW: LEARNING PROCESS IN NETWORKS

The process of learning in networks has received increasing attention with the proliferation of studies about public networks since the last decades (e.g. Provan and Milward, 1995; Turrini et al., 2010; McGuire and Agranoff, 2011). While organizational learning is a longstanding issue (e.g. Crossan et al., 1995), the analysis of the learning process that occurs inside networks is a more recent trend.

Yet, some ambiguity exist on current studies about network learning. Indeed, it is important to distinguish between network learning and learning in networks (Knight, 2002; White, 2008). While the former refers to “*learning by a group of organization as a group*” (Knight, 2002: 427), and it is also defined as inter-organizational learning or collective learning (Gerland and Heikkila, 2011), the latter is concerned with the learning process that occurs in individual organizations embedded in a network. The focus of our study is on this second issue given that we are here interested in how organizations learn inside public networks. The relevance of this issue is twofold. On the one hand, an organization that enters a network needs to identify some benefits in order to be motivated operating inside a network and learning can be one of these motivations. On the other hand, the

learning of an organization is considered a relevant feature to ensure the success of networks and collaborative arrangements more in general (Gerland and Heikkila, 2011).

Extant studies about learning in networks addressed three main issues: the type of learner that exists inside a network; the constitutive components of learning and, finally, factors that positively influence learning.

With respect to the learner, i.e. the entity in charge to learn, four main categories of learners have been identified: individuals, groups and teams, organizations and the whole network (Knight, 2002). Although traditional literature was concerned with the fact that “*all learning takes place inside individual human heads*” (Simon, 1991: 125), it is now widely acknowledged that learning can occur at different levels, which are interrelated with each other. Therefore, also networks can learn and this represents the highest level of learner, which is given not only by the sum of learning of network constituents (i.e. individuals, groups and organizations), but it also results from changes to network attributes (Knight, 2002). Although these different levels of learning are interrelated with each other, we here consider specifically an organization inside the network as the main learner.

As far as the constitutive components of learning is concerned, a distinction has been provided between the learning product and the learning process (Gerland and Heikkila, 2011). While the learning product is related to what has changed (Knight, 2002; White, 2008) at different levels depending on who is the learner, the learning process refers to those set of actions that led the change to occur, or to say it differently, it focuses on how the learning product has been achieved. In this study, we are interested in exploring both what changes have been achieved (i.e. the learning product) and how this learning process has occurred, by focusing on the third issue emerged from literature, represented by factors that drive learning. Studies in this field searched for determinants of learning, by discussing the impact of a range of factors over learning products (i.e. Gerland and Heikkila, 2011). Yet these studies, when applied to networks, focused on the learning at the collaborative level, neglecting the impact for the individual organization. We think that this is an important level of neglect given that the extent to which organizations contribute to network activity also depends on the individual benefits they have, and learning enters among these benefits. Furthermore, the majority of extant studies treat factors that drive learning in isolation, without considering their interplay.

By taking the individual organization inside the network as the unit of analysis, we focus on learning products to understand which conditions, or combinations thereof, favor learning in network settings. Specifically, we move ahead from extant studies along three different lines. First, by considering the individual organization inside the network rather than the whole collaborative activity; second, by considering jointly, rather than in isolation, a group of factors that can influence the learning process

and third, by exploring the different levels of learning products rather than treating this component as a monolithic achievement.

LEARNING IN NETWORKS: HYPOTHESIS DEVELOPMENT ON CONDITIONS THAT MATTER

Building on previous literature on learning and public networks (e.g. White, 2008; Gerlak and Heikkila, 2011), two main dimensions have been acknowledged as relevant to explore organizational learning inside networks: social dynamics and administrative stability. These dimensions have been here explored in relation to the learning product for individual organizations inside a network. Usually, also structural characteristics, which properly refer to network structure (i.e. network size, network configuration and network heterogeneity), are included among the relevant conditions that affect network learning. However, they have been here excluded from the analysis since they are not differential between cases in the sense that each organization belongs to the same network that has the same structural characteristics.

Social dynamics and administrative characteristics have been therefore our specific focus. They refer to two spheres of analysis. The former focuses on relationships between organizations involved in the network, while the latter concerns the specific organizational and governmental characteristics of each organization over time. This last dimension allows to account also for the historical characteristics of the organization itself. Drawing on extant studies, we present these characteristics and how they can potentially impact on learning in the form of hypothesis to be tested through the QCA.

Social dynamics

The dimension of social dynamics concerns relationships among organizations inside the network. It comprises the following elements: participation to learning events and forums, actors' interactions, definition of shared activities and previous experience of collaboration. All of these conditions appeared from literature to potentially affect learning outcome in networks, but none of them was found to be sufficient for this outcome to occur.

The participation to events, forums or other meeting occasions among network actors is expected to favor the exchange of information and therefore learning processes (Moynihan and Landuyt, 2009). Several empirical studies on how learning occurs inside individual organizations underlined the

establishment of learning forums as a relevant condition to learn (Sadler-Smith et al., 2000; Kleinman et al., 2002; Goh, 2003). In this respect, the exploration by Goh (2003) of two learning processes in two different organizations highlighted, among the other factors, learning forums, focus groups and more in general meetings among participants as a relevant occasion to improve learning capabilities. Moving to public network studies, the importance to establish forums, arenas and other meeting occasions among network participant have been investigated with reference to the network leadership (Crosby and Bryson, 2005; 2010). Indeed, by leveraging on these collaborative arena, the opportunities for collaboration among actors can improve and the role of the leader be effective (Crosby and Bryson, 2005). Even though public network literature does not directly address the impact on learning, drawing on organizational studies we assume that:

H1: The participation to learning forums is a necessary but not sufficient condition for learning to occur

In an analogous manner, the frequency and intensity of interactions among organizations inside the network was acknowledged as an essential condition for networks to learn (White, 2008; Gerlak and Heikkila, 2011). In this respect, White (2008) recognized that “in terms of the environment for network learning, it is essential that there is interaction between network members” (White, 2008: 705). This position was also supported by other studies on organizational learning (e.g. Hanssen-Bauer and Snow, 1996), which underlined the importance to establish open dialogue and communication between the parties in order to facilitate the creation of knowledge. We do not find instead explicit evidence about the importance of relationships in public network studies, although it is widely acknowledged that interactions between network actors are one of the distinctive features of public network (e.g. Mandell and Keast, 2007). Given this evidence, mainly from literature on organizational learning, we can assume that:

H2: Frequent and intense actors' interactions is a necessary but not sufficient condition for learning to occur

The existence of shared activities, often in communities of practice, was also considered as a moment to exchange information and opinion, positively contributing to learning (Mittendorff et al., 2006). This approach to shared activities early took place in “communities of practice” (Brown and Duguid, 1991; Wenger, and Snyder, 2000), intended as informal places where activities and problems are discussed between individuals, leading to knowledge and innovation of existent working practices (Brown and Duguid, 1991). The widely diffusion of the internet has led to a reinforcement of these shared activities, but through virtual communities rather than face-to-face in communities of practices (Christopher and Johnson, 2001; Dahlander and Magnusson). In both of the cases, benefits of sharing

practices and activities among participants were related to a better learning and innovation. When moving to the public network literature, shared activities have been discussed in relation to their importance to favor collaborative behavior (Mc Guire, 2006) given that the existence of these activities contribute to reinforce ties among network actors (Lemaire and Provan, 2010). However, no reference is provided with respect to network learning. Relying on extant evidence from studies about organizational learning, we assume that:

H3: The definition of shared activities is a necessary but not sufficient condition for learning to occur

Finally, some authors (see Gerland and Heikkila, 2011) highlighted the importance of organizational participation in other learning experiences in the same network or in other networks. This aspect has been highlighted by several authors, although with reference to organizational learning, as an important determinant to facilitate the learning process (Larsson et al., 1998; Ellström, 2001; Gerlak and Heikkila, 2011). For example, by focusing on the development of knowledge in strategic alliances, Larsson et al. (1998) underlined the importance of previous learning experience for successful inter-organizational learning to occur. We can therefore assume that:

H4: Previous experience of collaboration in learning network is a necessary but not sufficient condition for learning to occur

Administrative characteristics

Administrative characteristics concern the organizational and governance structure of individual organizations inside the network. These characteristics, which comprise the existence of dedicated resources, organizational commitment and organizational administrative stability, are expected to influence learning in networks, although few studies reported evidences.

There is literature on public networks, but also on organizational learning, that discusses how the availability of resources positively influence over network results (Dogson, 1993; Moynihan and Landuyt, 2009). Moynihan and Landuyt (2009) reported that when an organization provides adequate and dedicated resources it is more likely to learn: “*when organizations have some measures of organizational slack, they are more likely to be able to think proactively and devote specialized resources and time to learn*” (Moynihan and Landuyt, 2009, p. 1099). The positive relationship between the presence of dedicated resources and the ability to learn is reported by qualitative and quantitative studies (see Askim et al., 2008; Berends et al., 2003).

Given this evidence, we assume that:

H5: The existence of dedicated resources to network activities is a necessary but not sufficient condition for learning to occur

Furthermore, the presence of a strong commitment from the top of the organization has proven to be beneficial for achieving inter-organizational (and organizational as well) learning. The presence of commitment and leadership is recognized as having an important role in fostering organizational learning (Ostrom, 1999; Schneider and Ingram, 1997) and in blocking learning process (Cashare and Howlett, 2007). The presence of a strong commitment, indeed, could play a fundamental role in bringing people together, creating a favorable environment for learning and enhance trustworthiness of people involved in learning activities (Knight and Pye, 2005; Stork and Hill, 2000). We can therefore assume that:

H6: The presence of a strong commitment is a necessary but not sufficient condition for learning to occur

Finally, administrative stability, with respect to personnel involved in learning activities, is said to be a relevant factors that could positively affect learning in networks (Rashman et al., 2009; Lawrence, 2005). Administrative stability, in fact, can be helpful for the definition of shared norms, routines and practices that favor the diffusion learning and knowledge both in organizational and inter-organizational setting (Rashman et al., 2009).

H7: Administrative stability is a necessary but not sufficient condition for learning to occur

Conditions considered for the QCA analysis are summarized in table 1.

Table 1. *Before QCA: Social and Administrative conditions*

Characteristics	Specification	Effect on learning outcome
<i>Social dynamics</i>	H1: Organization and participation on learning events	Necessary but not sufficient
	H2: Frequency and intensity of actors interactions (frequency and intensity)	Necessary but not sufficient
	H3: Definition of shared activities	Necessary but not sufficient
	H4: Previous experience of collaboration in learning networks	Necessary but not sufficient
<i>Administrative characteristics</i>	H5: Dedicated resources/adequacy of resources	Necessary but not sufficient
	H6: Presence of commitment	Necessary but not sufficient
	H7: Administrative stability	Necessary but not sufficient

Starting from these factors identified from extant literature, we want to explore both the necessity of sufficiency relationships between these conditions and the learning outcome, and the identification of combinations of conditions that favor learning in network settings.

METHODOLOGY

In order to test the previous hypothesis about conditions that matter for organizations to learn in networks, we adopted a qualitative analysis based on QCA (Qualitative Comparative Analysis). This technique has been applied to a set of Italian universities (i.e. our organization) involved in a network, here called Academic Group for confidentiality reasons. In this section, we first present the research setting, by specifying the network and the organizations under investigation; then we clarify the approach to data collection, and finally we explain the QCA analysis by describing value attribution to conditions and outcome.

Research setting

The network under investigation is a voluntary network of Italian universities that was constituted in 1999 with the purpose to measure and benchmark administrative service performance delivered by each organization. The final aim of the network was to identify and share among participants best practices to improve service quality. The activity of the network is therefore cyclical with each cycle lasting one year. Administrative services that are the object of the analysis are first identified (e.g. personnel support, accounting support, IT support, infrastructure management); then, data are collected about customer satisfaction of internal personnel (i.e. administrative staff and professors) with respect to the abovementioned administrative services. Finally, data are benchmarked among universities searching for the best performer (i.e. the organization with the highest level of customer satisfaction over administrative services), who is called to present and explain how the service is managed inside its organization. The number of participants can vary from one year to another given that at every cycle, the invite to enter the network is extended to all the Italian public universities. The attention of this paper is on the last three cycles of the project, focusing only on those universities that have been the same over this time period. In total, we have therefore fourteen organizations under investigation.

Within this Academic Group network, we considered each university as a “single case study” on which the causal conditions and the presence of outcome (i.e. learning) are evaluated.

Data collection

To collect data we rely on both a qualitative and quantitative approach. From the qualitative side, we studied three cycles of the network activities (from 2011 to 2013) through direct participation at network meetings and learning forums, and direct interviews with key stakeholders. Direct participation at network meetings, which in total were 10 over the three years, allowed us to have a privileged position to observe social dynamics (actors' interactions, definition of shared activities and participation in learning forums). Every year a final learning forum was organized, where best practices about administrative service management were discussed together with the benchmark of the collected data. Moreover, several informal operational meetings were organized during each of the three years to discuss the operative activities about data collection from each organization. Direct interviews occurred at every cycle of the project in each of the university involved. Specifically, we interviewed the administrative director, the responsible of the Academic Group network and its support staff, when present, at each cycle of the project. In total, we carried out 42 interviews. Interviews were particularly useful to better understand administrative characteristics, with specific reference to administrative stability, previous experience of collaboration in learning networks, and the presence and the intensity of internal commitment over the network activities.

Qualitative data collection is summarized in table 2.

Table 2. Qualitative data collection

Year	N. of meeting followed	Duration	N. of interviews	Duration
2011	3	Half day	12	1 hour
2012	4	Half day	12	1 hour
2013	3	Half day	18	1 Hour
Total	10	--	42	--

We also relied on quantitative data produced by the network. Specifically, we analysed data from the satisfaction survey carried out to the administrative staff of each universities at each cycle of the project. The survey was designed by network participants to obtain information about the satisfaction of the administrative staff with respect to different aspects of services provided by the university; respondents were also asked to express an overall satisfaction level upon the services as a whole. The services analysed comprise personnel support, accounting support, IT support and infrastructure management. Given the objective of the network to share best practices about administrative service management, we considered the increasing of personnel satisfaction about administrative services as the organizational learning inside the network (i.e. the learning product). Specifically, by comparing the average satisfaction for each of the three years we assumed that where customer satisfaction

improved, then there has been a process of learning. On the contrary, when satisfaction decreases learning did not occur. Table 3 summarizes response rates for each university for each cycle of the project. The response rate has been calculated as the ratio between personnel who answer the questionnaire against the total administrative staff units of each university.

Table 3. Rate of responses

Case	2011	2012	2013
Bicocca	40%	37%	29%
Brescia	57%	48%	43%
Ferrara	76%	60%	54%
Genova	40%	--	24%
Insubria	60%	50%	69%
IUAV	49%	55,%	46%
Padova	37%	41%	40%
Pavia	53%	57%	60%
Polimi	56%	62,%	53%
PoliTo	24%	25,%	28%
UniTo	40%	33%	23%
Verona	37%	37%	37%
Salento	25%	33%	35%
PoliBa	11%	16%	32%

Qualitative Comparative Analysis

Data have been analyzed by adopting Qualitative Comparative Analysis (QCA), which was firstly developed by Charles Ragin in 1987 (Ragin, 1987) and the term QCA actually refers to both an approach and a research technique (Wagemann and Schneider, 2010; Rihoux, 2003; Ragin, 1999).

As an approach, QCA is comparative in nature. Specifically, it is “*geared toward multiple-case studies, in a small or intermediate-N research design*” (Rihoux and Lobe, 2008, p. 223) and it is aimed at both gathering in depth information about cases and producing, at the same time, some levels of generalization (Rihoux and Rezsohazy, 2011; Ragin, 1987). A key concept of QCA, also applied in this research, is the idea of “multiple conjunctural causation” (Rihoux, 2003; Ragin, 1987), according to which, often, it is a combination of conditions that produces a phenomenon and, similarly, several different combinations of conditions may produce the same outcome (Ragin, 1987). Permanent causality is indeed rejected when applying QCA (Rihoux and Lobe, 2008).

Although developed into social sciences, QCA is now applied in several disciplines to achieve different purposes: summarize data into a truth table, check coherence between data and highlight eventual contradictions, test existing theories or assumptions, test or elaborate new ideas. In this research, QCA is supporting us in both testing the necessity and sufficiency relationship of conditions

with the outcome, and to provide new ideas on the set of conditions - or their combinations – that favor learning across organizations in networks.

Given the small number of cases, this research uses the TOSMANA (TOoll for SMALL N Analysis) Software developed by Cronqvist to carry out the csQCA analysis. This software is particularly useful for the purpose of this analysis since, being based on Boolean algebra, it uses multi-value scale (MV-QCA) retaining, meanwhile, the ability of performing a synthesis of the data set expressed in a parsimonious solution (Cronqvist, 2004).

Variable and outcome value

This section details how the variables (social dynamics and administrative characteristics) have been attributed 1 or 0 value (table 4) as well as the how outcome value has been defined.

Drawing on previous literature, we identified several variables that could affect learning in network setting, which have been grouped into the two dimensions of administrative characteristics and social dynamics. We follow this categorization to keep under control the relationship between the number of variables, the number of possible combinations and the number of cases. The use of csQCA, being based on Boolean algebra, implies the attribution of only two values: 0 and 1, where 0 usually means “absence of the condition” and 1 is related to the presence of a specific condition. However, if the variables have a qualitative character, 0 and 1 values could refer to a specific characteristic of the condition. Administrative characteristics and social dynamics are synthetized in Table 4 and described below together with the assigned values.

The outcome value has been instead defined with reference to the results of the satisfaction survey carried out by each university within the network. When the customer satisfaction results improved from the first cycle to the third cycle of the project, this means that the organization has learnt and therefore we assigned a value of 1. The value of 0 has been instead assigned when the results of the customer satisfaction surveys decreased over the last three years of the network activity.

Table 4 Value attribution and dichotomization.

Variable		Description	Attribution and name	Value
Social dynamics	Learning events and forums	Organization and participation in learning forums	Sporadic participation (learn_ev)	0
			Frequent and active participation (LEARN_EV)	1
	Actors' interactions	Frequency of actors interactions	Sporadic interactions (act_int)	0
			Frequent interactions (ACT_INT)	1
	Shared activities	The degree to which activities are defined by participants through a collaborative process	Non participation in definition of shared activities (shared_ac)	0
			Participation in defining shared activities (SHARED_AC)	1
	Previous experience	Whether or not participants have had previous experiences of collaboration and/or learning networks	Any previous experience (prevexp_coll)	0
			At least one previous experience (PREVEXP_COLL)	1
Administrative characteristics	Dedicated resources	Existence of dedicated resources involved in the project as representative of the university	Any dedicated resources (ded_res)	0
			Specific resources to be part in the project (DED_RES)	1
	Commitment	Commitment of the General Director	Commitment, trust motivation low (comm)	0
			High commitment, trust and motivation (comm)	1
	Administrative stability	Stability of the people involved in the project	People change every year (admin_stab)	0
			Stability over year (ADMIN_STAB)	1
Outcome	Learning	Improvement in customer satisfaction scores	Decrease in CS score (learn)	0
			Improvement in CS score (LEARN)	1

Four different variables have been identified under the concept of social dynamics. The first, *learning events and forums*, refers to the participation in learning forums and informal events organized during the year. Here participants have mainly two types of participation: “sporadic” (0 value, learn_ev), when representatives of each university participate in one or two events per year, or frequent and active participation (1 value, LEARN_EV), when universities’ representatives were always present in learning forums and they interact actively. *Actors’ interactions* is a condition focused on the

frequency, and the intensity, of actors interactions. Two situations could occur: actors interact and on a frequent basis, both formally during project meeting, and informally by themselves (1 value, ACT_INT) or, conversely, their interactions are limited to project meetings where, their interactions were not spontaneous, but forced by the necessity to take decisions (0 value, act_int). The third social dynamic condition refers to the *definition of shared activities*. Here we observed two situations: some actors actively define activities to be carried out within the network (e.g. services to be evaluated, structure of the satisfaction survey) (1 value, SHARED_AC), while other actors passively accept what the others propose (0 value, shared_ac). Finally, *previous experience* of collaboration in learning is the last social dynamic characteristics. This condition is traditionally dichotomized into 0 value (prevexp_coll), that indicates the absence of such experience, and 1 value (PREVEXP_COLL) for those cases that already experienced collaboration in learning network(s).

Three variables articulate the administrative characteristics. The first of these includes the presence of *dedicated resources* to network activities, whereby “dedicated resources” we refer to the presence of ad hoc personnel fully devoted to the network activity. These personnel both represent the university in network’s events and were responsible to implement and monitor activities within their own university, and then report results to the whole network. The variable is dichotomized into absence (0 value, ded_res) and presence (1 value, DED_RES). In the former value, it represents cases in which people working on the project are also in charge of monitoring other different activities; the second case refers to situations in which people working on the project are specifically in charge of following full time the network activities. The second variable refers to the top-level commitment (generally intended as the commitment of the university General Director). We attributed 0 value (comm) when the top level commitment was low as well as when the General Director was not convinced about the potentiality of the project. In this situation, universities enter the network because the project has a relevance at the national level and not because they recognized the value of benchmarking performances. On the contrary, the situation in which the General Director was committed, trusted and motivated the participation in the project was given 1 value (COMM). Here, we find the situation in which the General Director pushed the participation and the renewal of the project each year. We finally identify administrative stability that refers to the stability of the people in charge of participating and monitoring the project. We listed the name of the contact persons each year and when they changed we attribute 0 value (admin_stab), while if they remain the same we give 1 value (ADMIN_STAB).

Finally, the outcome we want to explain, i.e. learning in network setting, was measured through the average score of customer satisfaction survey to administrative staff for each service. When the

customer satisfaction decreases the outcome was absent (learn), while when the score increases we assume that some learning process happened and we therefore attribute 1 value (LEARN).

FINDINGS

This section presents and discuss results from the QCA analysis. We carry out two separated analysis for social dynamics and administrative characteristics. In both the analysis, the outcome value is the same since its data and evaluation do not change during the analysis. Therefore, the case of success, i.e. the cases in which outcome value is equal to 1, remains the same. Table 5 represents per each university (i.e. the case) the variation of the customer satisfaction (CS) score over the last three years and the related outcome value.

Table 5. Cases and outcome value

University	CS score	Outcome evaluation
Bicocca	-0,43	0
Brescia	-0,20	0
Ferrara	-0,13	0
Genova	-0,39	0
Insubria	0,09	1
IUAV	0,12	1
Padova	-0,25	0
Pavia	-0,37	0
Polimi	-0,06	0
Polito	-0,17	0
Unito	-0,16	0
Verona	-0,19	0
Poliba	0,17	1
Salento	-0,23	0

We found only three cases of success in which the customer satisfaction scored between 2011 and 2013 increased. In working with csQCA we consider all the cases to build truth table, but, to find out conjunctural causal paths, we focus on those cases in which learning process occur (i.e. CS score > 0).

Social dynamics

According to literature, we identify four social dynamics conditions that could affect the occurrence of learning in network setting: participation in learning events (Learn_ev), actors' interactions

(Act_int,), the definition of shared activities (Shared_ac), and previous experience of collaboration in learning network(s) (Prevexp_coll).

Based on our fourteen cases we first built the truth table that displays all the possible combinations of conditions and outcome (Table 6). The identification of four conditions lead to nine possible combinations of conditions and outcome.

Table 6. Social dynamics: Truth table

ID	Learning events	Actors' interactions	Shared activities	Previous experience of collaboration	Outcome
Bicocca, Brescia, Pavia, Polimi	1	1	1	0	0
Ferrara	1	0	0	0	0
Genova, Salento	0	0	0	0	0
Insubria	1	1	0	1	1
IUAV, Poliba	0	1	0	0	1
Padova	1	1	0	0	0
PoliTo	0	0	0	1	0
UniTo	1	0	1	1	0
Verona	0	1	0	1	0

Before the analysis starts, it is fundamental to assess the quality of a truth table (Schneider and Wagemann, 2010; Rihoux and De Meur, 2008). Specifically we can proceed with the csQCA analysis since: there is a mix of positive (3 cases) and negative cases (11 cases); there are no counterintuitive configurations and cross-condition diversity is present¹.

Because our research interest is to understand which conditions, or their combination could favour learning in network setting, we focus the analysis on the three cases that present a value of 1 in the outcome. However, given the fact that one of the goal of the QCA is to provide a synthetic solution, we have to understand whether all the identified conditions should be considered for the analysis. Specifically, from Table 5, we can observe that the condition “shared activities” (fourth column) displays 0 value in all the three cases. Therefore we can assume its inability to explain the occurrence of the outcome and we delete it from the analysis.

Through the application of TOSMANA software, we can provide the more parsimonious solution that can explain the outcome and answer the following question: which conditions related to social

¹ Assessing cross-condition diversity means control that some conditions do not display exactly the same value across all cases (Rihoux and De Meur, 2008).

dynamics could favour learning in network setting? We found that learning in network setting could occur under two different causal paths (or combinations of conditions):

A frequent and active participation in learning forums is combined with frequent actors' interactions and previous experience of collaboration in learning network (in QCA words,

LEARN_EV*ACT_INT*PREVEXP_COLL)

OR

Participation in learning forum is sporadic and actors do not have previous experiences of collaboration in learning network(s), but the interactions with actors are frequent and active (in

QCA words, learn_ev*ACT_INT*prevexp_coll)

Therefore we can derive that frequent and active actors' interactions is a necessary but not sufficient condition for learning to occur, but its relevance seems much more important compared to participation in formal learning forums organized within the network.

Administrative characteristics

Three administrative conditions were found to be relevant according to literature: dedicated resources (Ded_res), top-level commitment (Comm) and administrative stability of the staff involved (Admin_stab).

We started by developing the truth table and assessing its quality. Also in this situation we have a mix of positive and negative cases, any counterintuitive configurations can be found and the cross-condition diversity is verified also in the case of administrative stability. The truth table related to administrative characteristics is provided in table 7. In this case, the identification of three conditions leads to six possible configurations.

Table 7. Administrative characteristics: truth table

ID	Dedicated resources	Top-level commitment	Administrative stability	Outcome
Bicocca, Brescia, Ferrara, Padova, Pavia, PoliMi	1	1	1	0
Genova, UniTo, Verona	0	0	0	0
Insubria	1	1	0	1
IUAV	0	0	1	1
PoliTo, Salento	1	0	0	0
PoliBa	0	1	0	1

Differently from the analysis of social dynamics, here the three cases with a positive outcome value follow three different causal paths and we cannot delete - or synthetize – the conditions to be analyzed through TOSMANA. Indeed, we cannot eliminate variables that, *a priori*, are not able to explain the occurrence of learning, but we should consider all the three conditions.

The analysis implemented with the software allows us to preliminarily say that, with respect to administrative characteristics, learning can occur in network setting following two different causal paths:

*The administrative staff specifically devoted to the learning networks is unstable and it changes over year, but this instability is compensate by a high degree of top-level commitment (in QCA, COMM*admin_stab)*

OR

*There are no dedicated resources and low degree of top-level commitment, but there is relatively low turnover of administrative staff involved in the learning networks and people working on the network remains stable over time (in QCA, ded_res*comm*ADMIN_STAB).*

Therefore, we can assume that nor administrative stability nor commitment are sufficient conditions for learning to occur in network setting, but they can be seen as mutually substitutable for favoring learning processes.

To sum up, the analysis has provided relevant insights with respect to the role of administrative and social conditions in favoring learning. Specifically, compared to the existing literature we found that many of the variables identified in literature were not verified in our analysis (table 8). The only exception refers to the intensity of actors' interactions that actually seems to be necessary but not sufficient for learning to occur.

Table 8. Necessity and sufficiency: back to literature

Characteristics	Specification	Effect on learning outcome	Results
<i>Social dynamics</i>	H1: Organization and participation on learning events	Necessary but not sufficient	Not verified
	H2: Frequency and intensity of actors interactions (frequency and intensity)	Necessary but not sufficient	Verified
	H3: Definition of shared activities	Necessary but not sufficient	Not necessary

	H4: Previous experience of collaboration in learning networks	Necessary but not sufficient	Not verified
<i>Administrative characteristics</i>	H5: Dedicated resources/adequacy of resources	Necessary but not sufficient	Not verified
	H6: Presence of commitment	Necessary but not sufficient	Not verified
	H7: Administrative stability	Necessary but not sufficient	Not verified

DISCUSSION

This paper focused on the exploration of those conditions that influence organizational learning inside public networks. A QCA analysis has been applied to a set of conditions derived from previous literature on organizational learning and public networks, while the specific cases under investigations were Italian universities taking place to a network in charge of identifying best practices to manage administrative public services.

The analysis supports the discussion about which social dynamics and administrative factors can influence learning in networks.

To begin with social dynamics, two issues seem to be relevant for learning process: the importance of informal relationships and the contribution of the previous experience of collaboration in learning networks.

With respect to the first element, learning seems to occur through informal channels (i.e. frequent actors interactions) rather than through formal learning mechanisms (i.e. participation in learning forum). This result was also confirmed by direct interviews and participations at network meetings. Indeed, some participant universities (e.g. Genova or Salento) used to have a peripheral role during the entire cycle of the project, simply waiting for procedures to be implemented and participating to formal network meetings. On the contrary, some other universities, such as Brescia, Bicocca or Polimi adopted a different approach. They were actively involved during the whole cycle of the project, also exploiting phone calls, informal discussions and frequent informal emails. Their purpose was to fully understand the characteristics of the analysis in order to obtain the higher value from the participation in the project. Indeed, data derived from each cycle of the project were then used by this last group of universities in order to better allocate internal resources and make decisions about how to change administrative service (i.e. improving some areas, while reducing the efforts on those areas where people are not interested).

A second finding associated to social dynamics is related to the fact that more experienced actors could inform newer actor (i.e. without previous experience of collaboration in learning network) to

favor their learning process. However, for learning process to occur also in newer actors, it is necessary that they are willing and inclined to interactions with other participants. Indeed observations and interviews confirmed the results from QCA, which contends that actors' interactions are a crucial aspect for learning to take place. Even when an organization is a newcomer inside a network, as this was the case of Genova, the ability to interact and share ideas with other network participants allow the organization to be fully involved in the project.

We secondly focused on the role of administrative characteristics. Here we derived two main results, which are relevant from a learning perspective.

First, high commitment (and therefore trust and motivation with respect to the learning network) and stability of administrative staff involved seem to be interchangeably for organizational learning to occur in networks. This aspect was visible also from interviews carried out with the administrative staff along the three years of the project cycle. The University of Insubria for example, was characterized by a high level of commitment from the administrative director, who directly participated at several network meetings and was interested in how the participation to the network activity was evolving and sharing final results inside its own university. Learning in this university has occurred even though over the years the administrative director as well as the direct responsibility over the project has changed over time.

The second result supports the contention that in situations in which the level of commitment is low, the ability and the competencies of administrative staff can substitute the role of top manager in favoring organizational learning. This was the specific case of IUAV, where commitment from the administrative director was almost absent, but however, the constant and direct participation of the network staff to all the phases of the project, frequent formal and informal interactions, lead the staff to maintain high level of attention over the project, finally leading to organizational learning.

CONCLUSION

This paper deals with learning process in network settings. Specifically, through the QCA analysis, our research goals was to understand which social and administrative conditions favor organizational learning of network participants.

Our findings highlight that both social and administrative characteristics can favor learning process in network settings. Specifically, informal channel and previous experience of collaboration can facilitate learning process between actors while, with respect to administrative characteristics, top-

level commitment and administrative stability seem to be interchangeably to promote organizational learning.

Although the preliminary nature of this research, we contribute to the existing literature in two directions. First, we explore a new topic of research, whose practical implications could actually lead to improvement of learning network design. Secondly, thanks to the use of QCA, we consider all the conditions simultaneously, to provide practical guidelines on how to design an effective learning network.

Future research avenues could be identified. First, other studies can explore how to improve informal participation between participants and how to manage it without changing the informal nature. Other studies again can investigate which type of previous experiences could be more fruitful to inform all the network participants and improving the learning of the network as a whole. Finally, by considering the network as a whole as unit of analysis, a further exploration can be related to which conditions, or their combinations, favor learning at the network level.

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